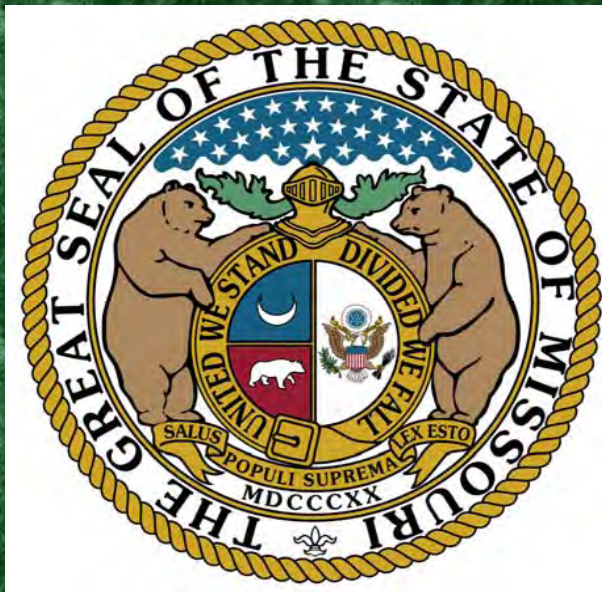


# Missouri's Energy Task Force Report: A Comprehensive Look at Fossil Fuels & A Plan for Missouri's Future

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# Background:

- Governor Holden convened groups to study these issues in 2001 and 2003.
- The Missouri PSC studied affordability issues in 2004.
- Governor Blunt formed the Missouri Energy Task Force by Executive Order on December 27, 2005.

# TASK FORCE MEMBERSHIP:

- Jeff Davis, Chair of the Public Service Commission
- Lieutenant Governor Peter Kinder
- Speaker of the House Rod Jetton
- President Pro Tem of the Senate Mike Gibbons
- Representative Rex Rector, Chairman of the House Utilities Committee
- Senator David Klindt, Chairman of the Senate Commerce & Environment Committee
- Fred Ferrell, Director of Agriculture
- Doyle Childers, Director of DNR
- Lewis Mills, Office of Public Counsel



# The Charge of the Task Force:

- By no later than August 31, 2006, to make specific recommendations to the Governor on the following topics:
  - (1) lessening Missouri's dependence on oil and other fossil fuels;
  - (2) assist Missourians who need help affording their winter heating bills;
  - (3) promote the development of alternative fuel sources in ways that strengthen the farm economy of rural Missouri; &
  - (4) encourage Missouri utilities to develop and operate electric power generation resources that will provide low-cost electricity well into the future.

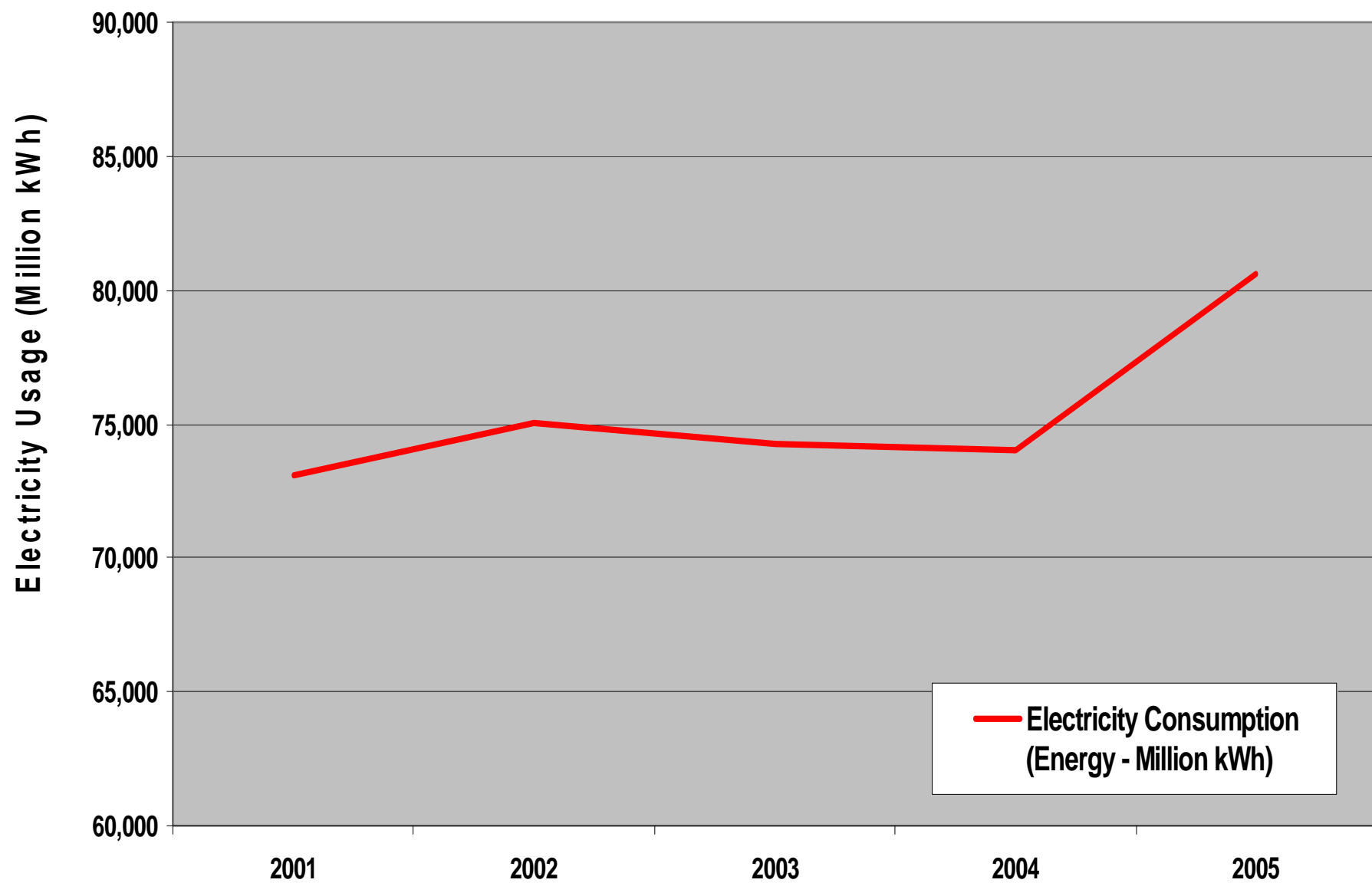
# Issue #1: Measuring the Extent of Missouri's Fossil Fuel Consumption

- 89% of Missouri's electricity is generated using fossil fuels:
  - 85.6 % uses coal as a fuel source; and
  - 3.5 % uses natural gas and petroleum.
- Approximately 60% of the homes in Missouri are heated by natural gas.
- There are more than 5.3 million registered motor vehicles registered in Missouri.

# The Extent of Fossil Fuel Demand:

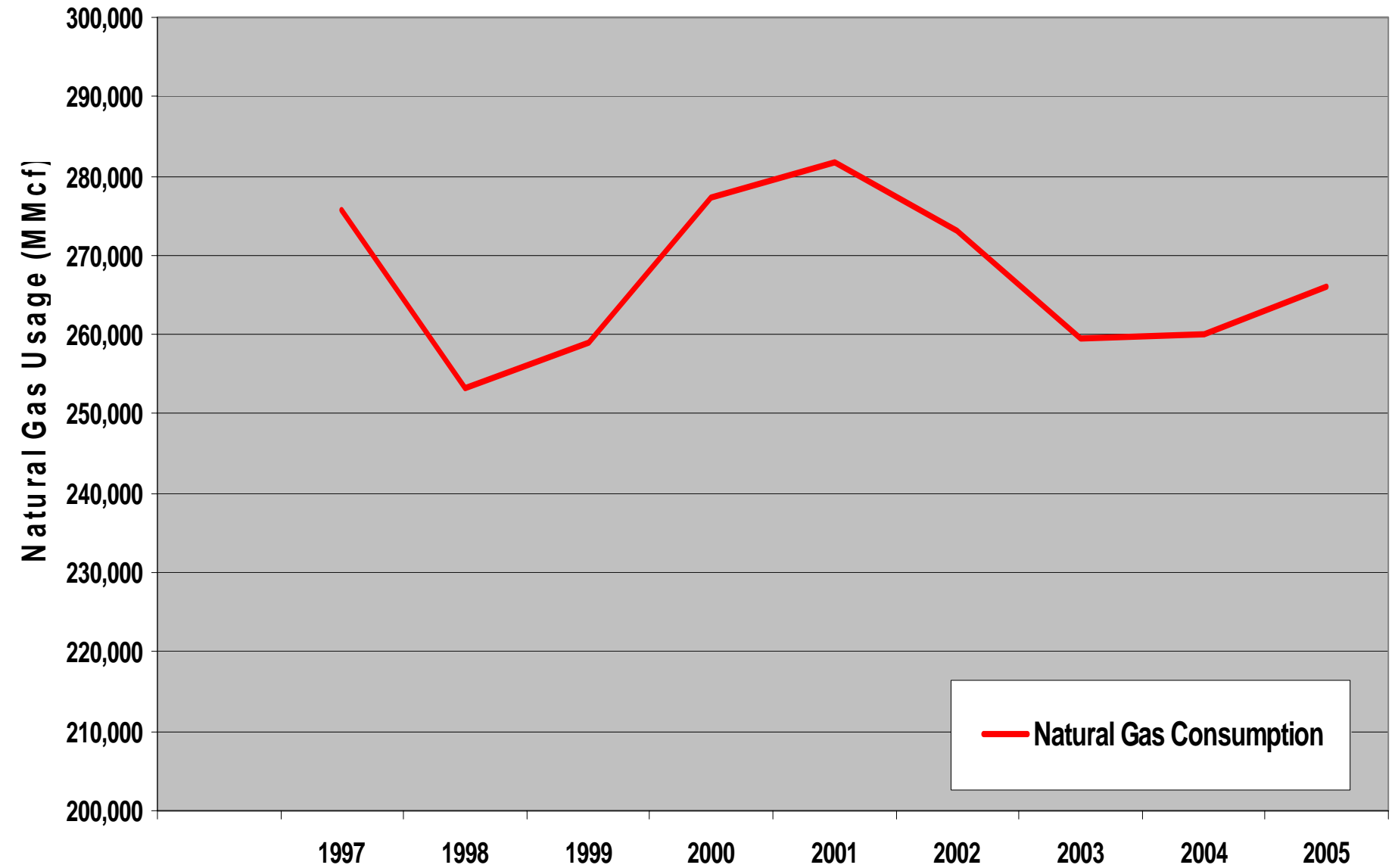
- Based on sales tax collections, More than 3.2 billion gallons of gasoline and 1.5 billion gallons of diesel fuel were sold in Missouri in FY '06.
- Missouri coal plants burned more than 45 million tons of coal in 2004. (source DOE/EIA 2004 MO Data)
- Missouri consumed more than 260 billion cubic feet (Bcf) of natural gas. (source DOE/EIA 2004 MO Data)
- 15% of all natural gas consumed in Missouri is used to make electricity.

## State of Missouri Annual Electricity Usage



Source: DOE/EIA MO Data

## State of Missouri Annual Natural Gas Usage

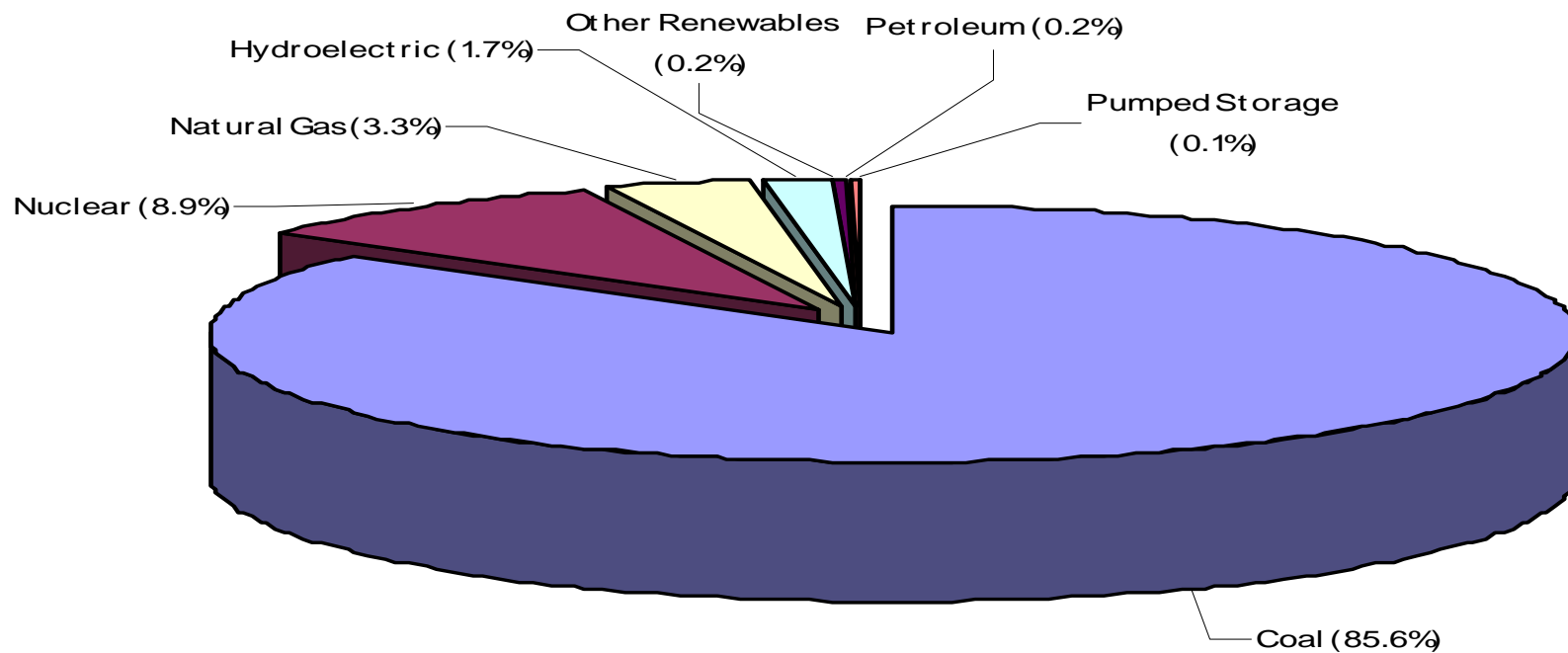


Source: DOE/EIA MO Data



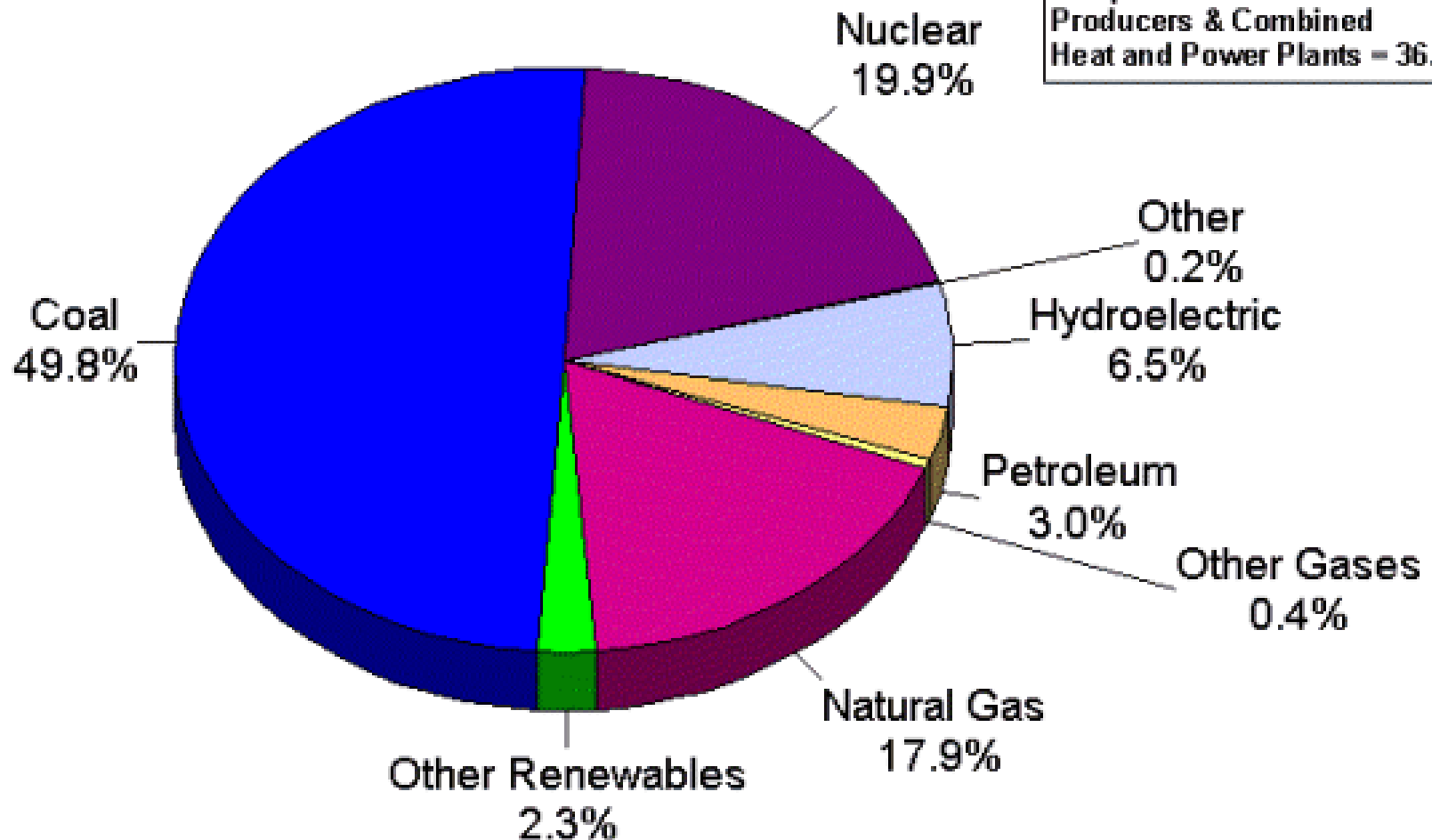
Where your electricity  
and heat come from:

## Missouri's Electric Energy Resources by Fuel Type (2004 DOE EIA Data)



## United States – Generation by Fuel Type:

Total = 3,971 Billion KWh  
Electric Utility Plants = 63.1%  
Independent Power Producers & Combined Heat and Power Plants = 36.9%



Note: Conventional hydroelectric power and hydroelectric pumped storage facility production minus energy used for pumping.

Source: DOE/EIA Data

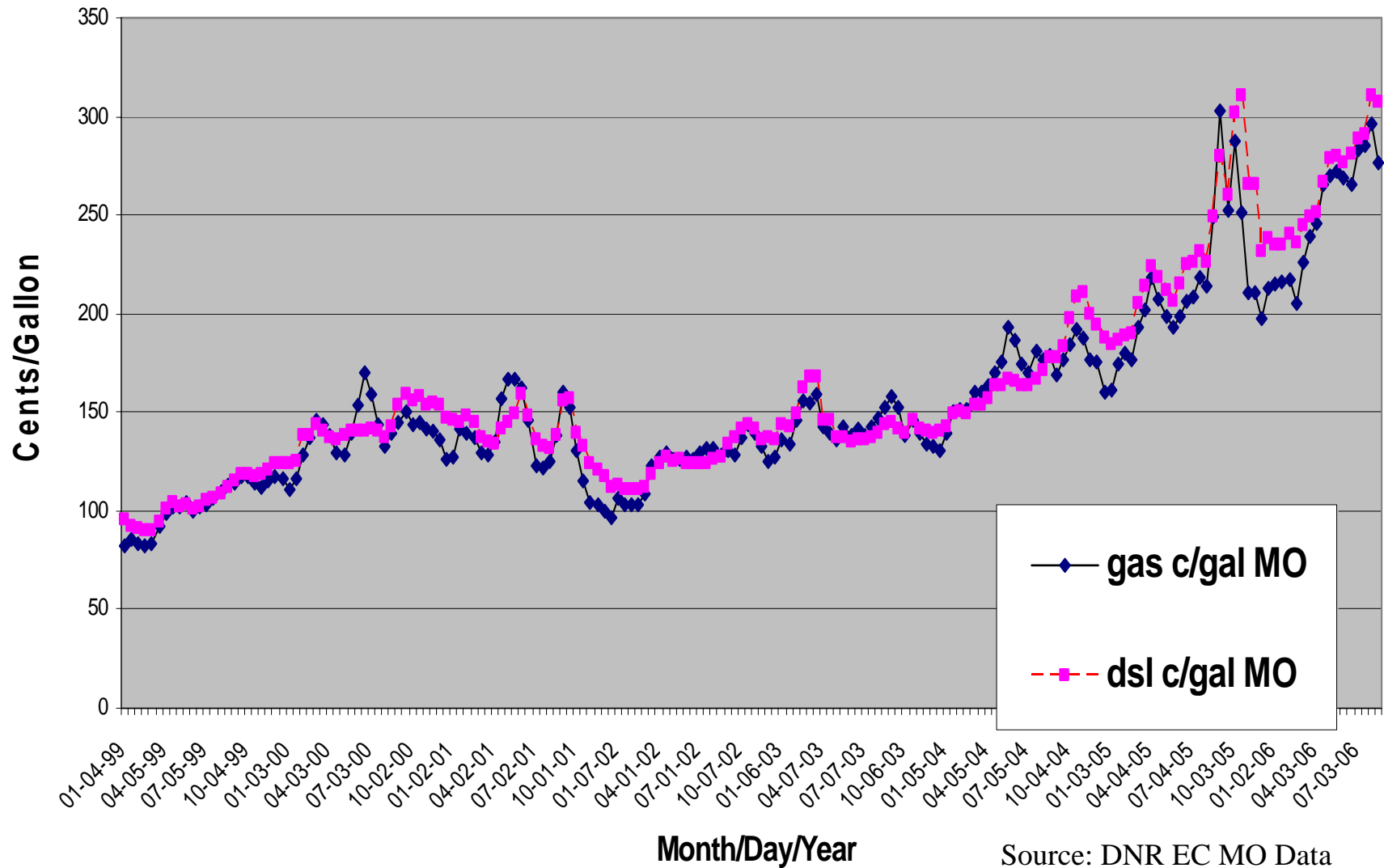
# Residential Winter Heating Fuel Sources in Missouri

- Natural Gas – 57%
- Electricity – 26%
- Propane – 13%
- Wood – 3%
- Other – 1%



# Commodity Prices Are Rising:

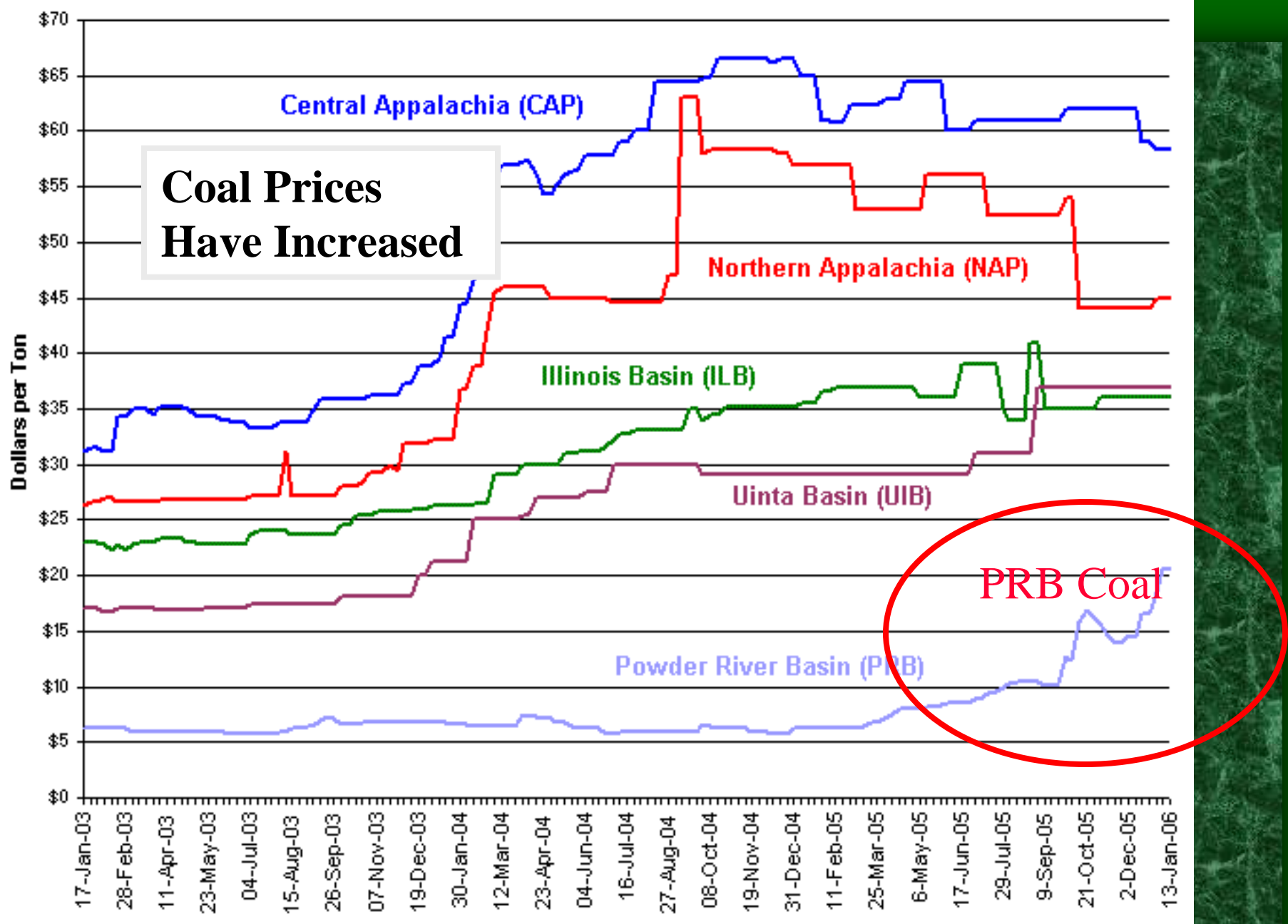
# Gasoline & Diesel Prices in Missouri



# Natural Gas – Historical Market Monthly Closings @ NYMEX:



\$/MMBtu



#### Key to Coal Commodities by Region<sup>1</sup>

Central Appalachia: Big Sandy/Kanawha 12,500 Btu, 1.2 lb SO<sub>2</sub>/mmBtu  
Northern Appalachia: Pittsburgh Seam 13,000 Btu, <3.0 lb SO<sub>2</sub>/mmBtu  
Illinois Basin: 11,800 Btu, 5.0 lb SO<sub>2</sub>/mmBtu

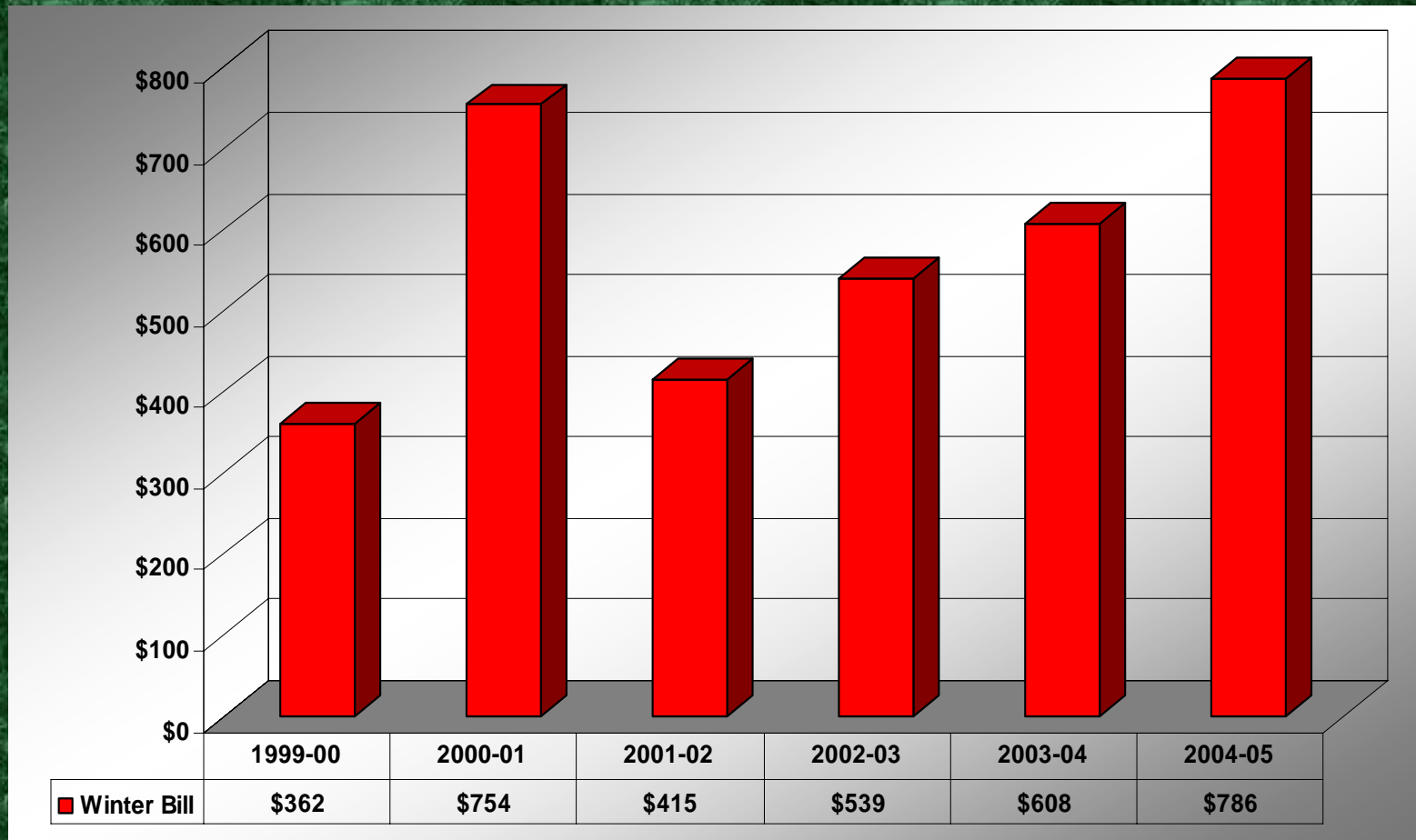
Powder River Basin: 8,800 Btu, 0.8 lb SO<sub>2</sub>/mmBtu  
Uinta Basin in Colo.: 11,700 Btu, 0.8 lb SO<sub>2</sub>/mmBtu



## Issue #2: High Energy Prices Hurt Missouri Consumers

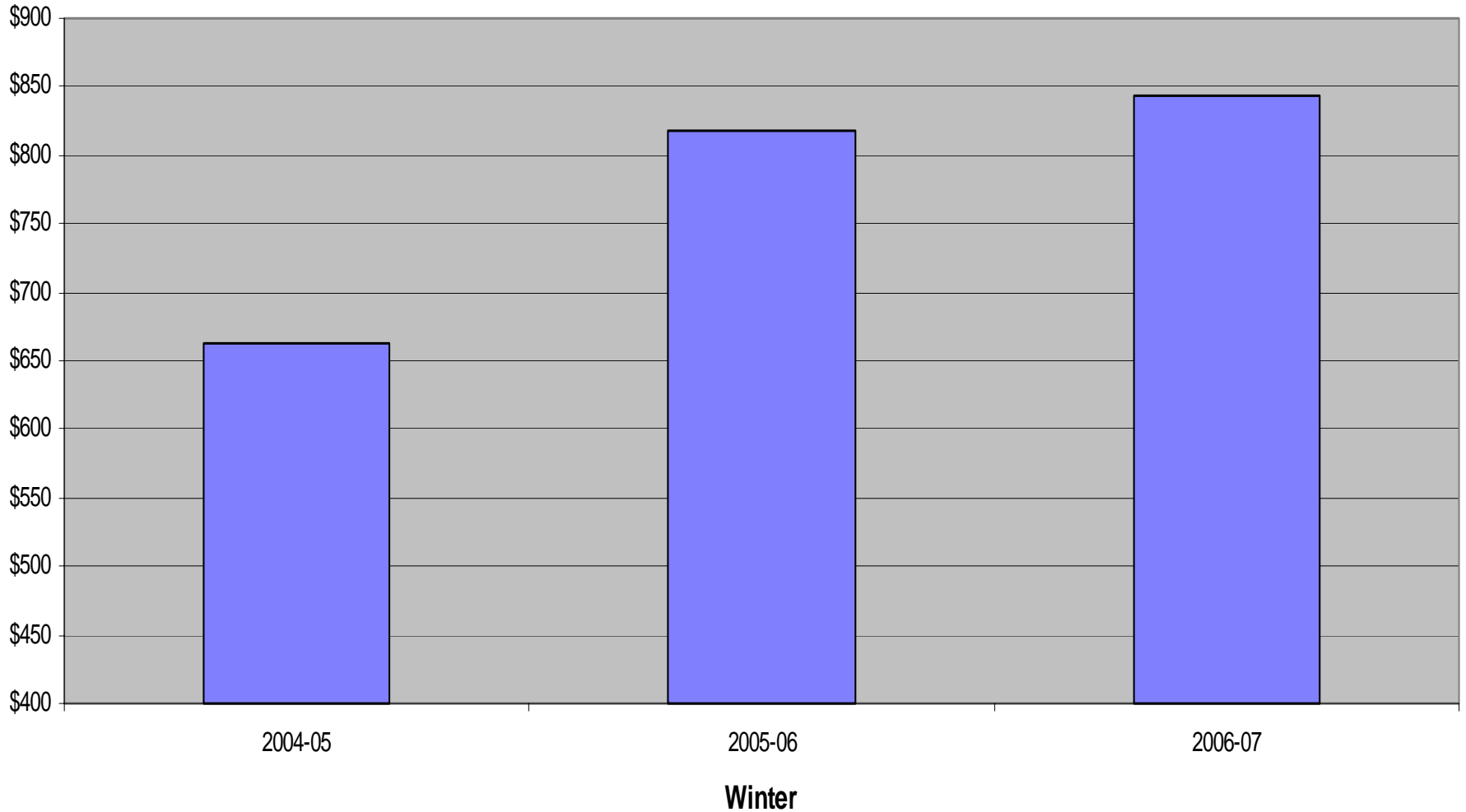
- The Midwest Energy Efficiency Alliance estimates Missourians will spend approximately \$11.7 billion this year for fossil fuels (petroleum, coal and natural gas). That's more than \$2,000 per person, per year.
- Bills for natural gas have more than doubled over the last 7 years due to rising natural gas prices.
- Gasoline prices have more than doubled in less than 3 years.
- Research demonstrates Missourians are being forced to make tough choices.

# What Kind of Trend Are We Seeing in MO's Residential Natural Gas Bills?



Laclede Gas Company – 5 month Residential winter bill before taxes 18

**Average Missouri Residential Customer 5 - Month Winter  
Natural Gas Bill (before taxes)**



# How many people are affected?

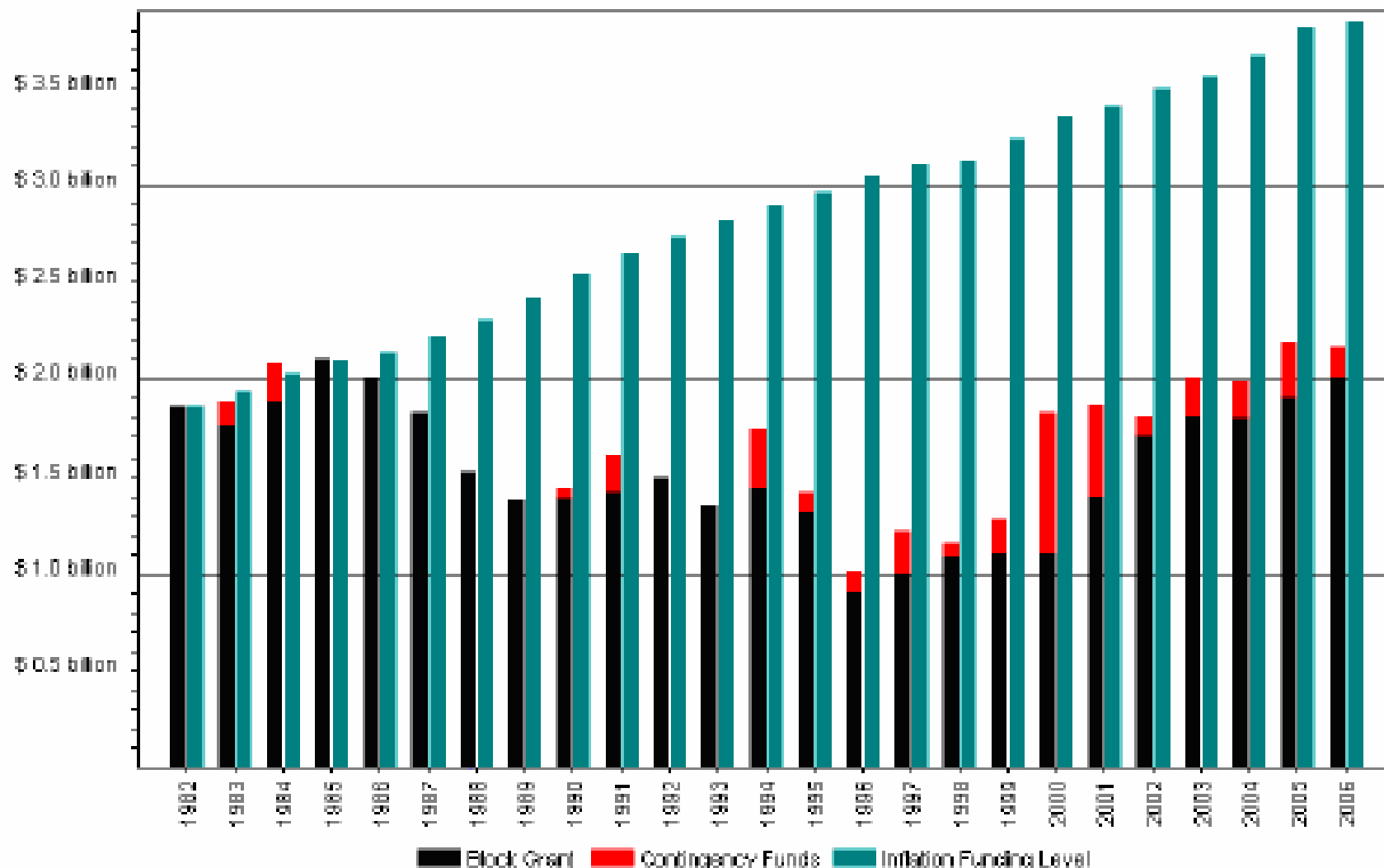
- Approximately 5.8 million people and 2.3 million households in Missouri.
- 11.8% of the population is below the federal poverty line.
- More than 500,000 households at or below 150% of the federal poverty level. A great percentage of those households include the elderly, disabled and children.



# What Assistance is Available for Low-Income Missourians?

- The federally-funded Low-Income Home Energy Assistance Program (LIHEAP) is the cornerstone for public utility assistance in Missouri.
- The Utilicare Stabilization Fund, when funded, has provided additional support.
- The PSC has approved assistance plans on a case-by-case basis in utility rate cases.
- Additional programs are sponsored by various faith-based and non-governmental agencies.

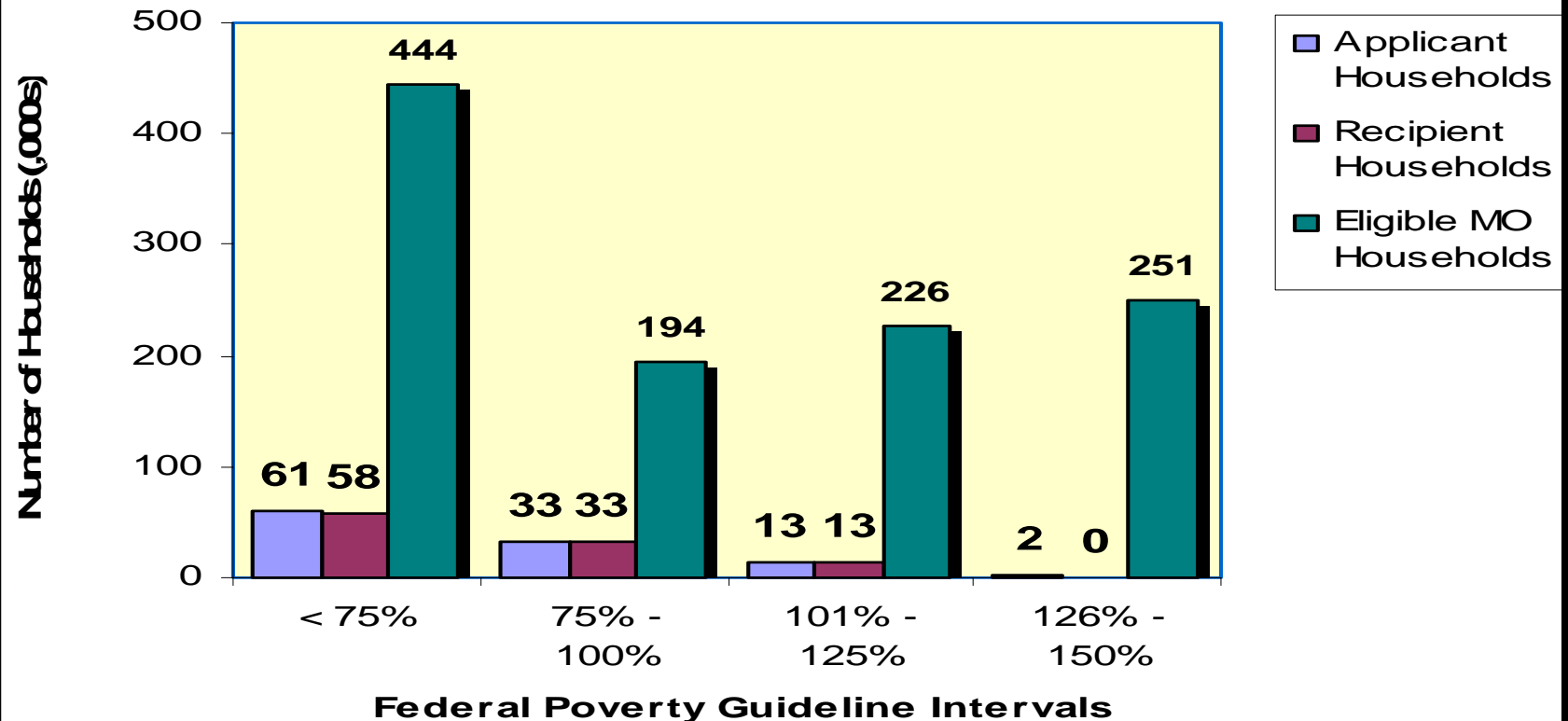
# LIHEAP Appropriations: Actual vs. Keeping Pace With Inflation



Sources: LIHEAP Clearinghouse, Low-Income Energy Programs Funding History, 1977-2006; Bureau of Labor Statistics Inflation Calculator

# How Many MO Citizens Receive LIHEAP?

## 2004 Energy Assistance in Missouri: Applicant, Recipient, and Eligible Households

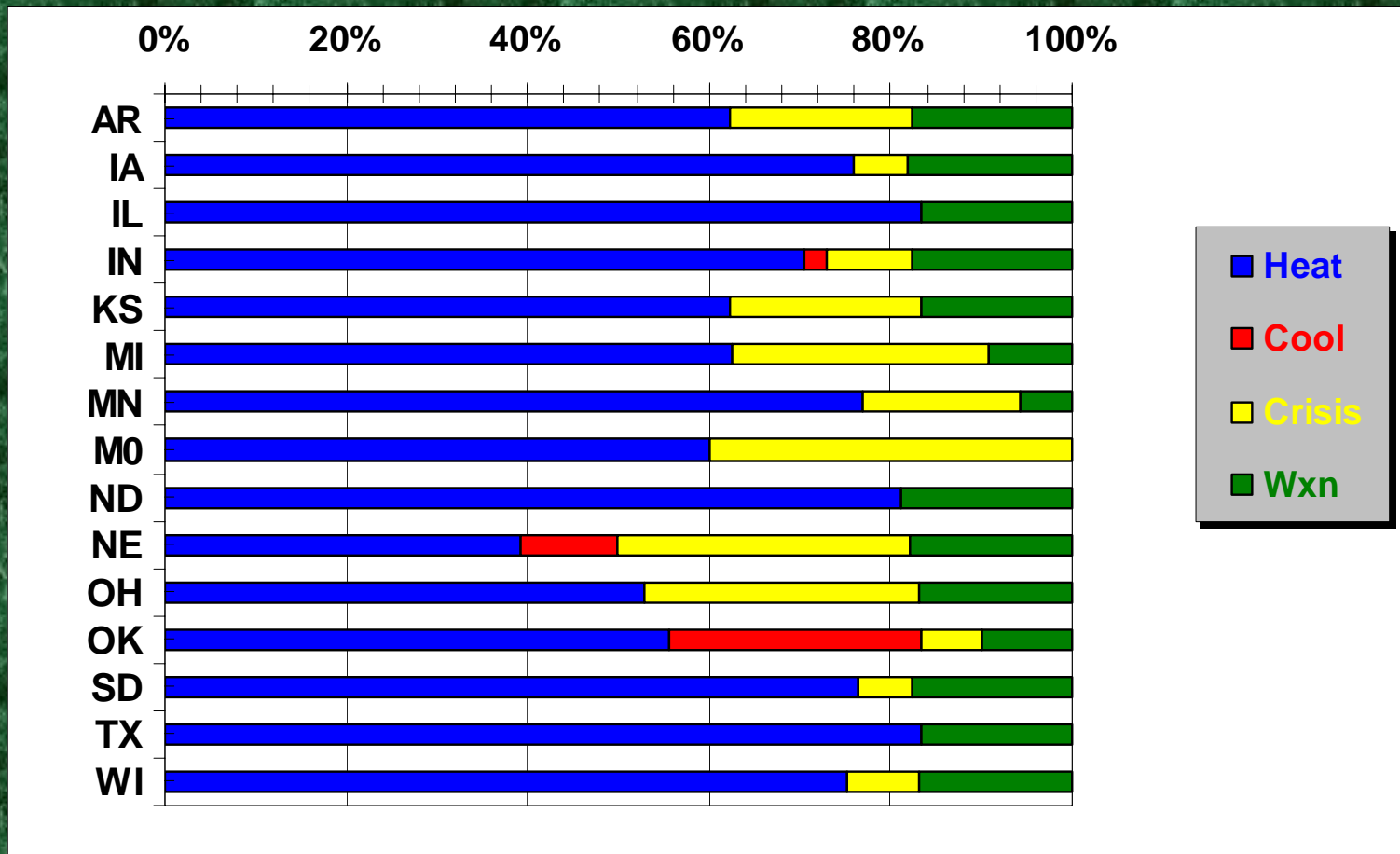


# 2006 LIHEAP Demand

- The St. Louis Metropolitan Area saw an approximate 20% increase in households applying for LIHEAP energy assistance for the FIRST time in 2006.
- The Kansas City Metropolitan Area saw an approximate 32% increase in households applying for LIHEAP energy assistance for the FIRST time in 2006.
- Absent timely distribution of LIHEAP funds, Missouri customers will be left with even higher arrearages heading into the next heating season.



# How DO Neighboring States Apportion LIHEAP Dollars?



# What Trade-Offs Do Missouri's Low-Income Households Face?

A 2004 study by Roger Colton found that, of the 734 low-income participants:

- 46% of respondents report that they “often” or “sometimes” go without food in order to pay home energy bills.
- 45% of respondents report that they “often” or “sometimes” do not take medicine, or take a decreased dosage of medicine in order to pay home energy bills.
- 22% had moved twice in the past two years, or had moved once in the past year and intended to move again in the next year.

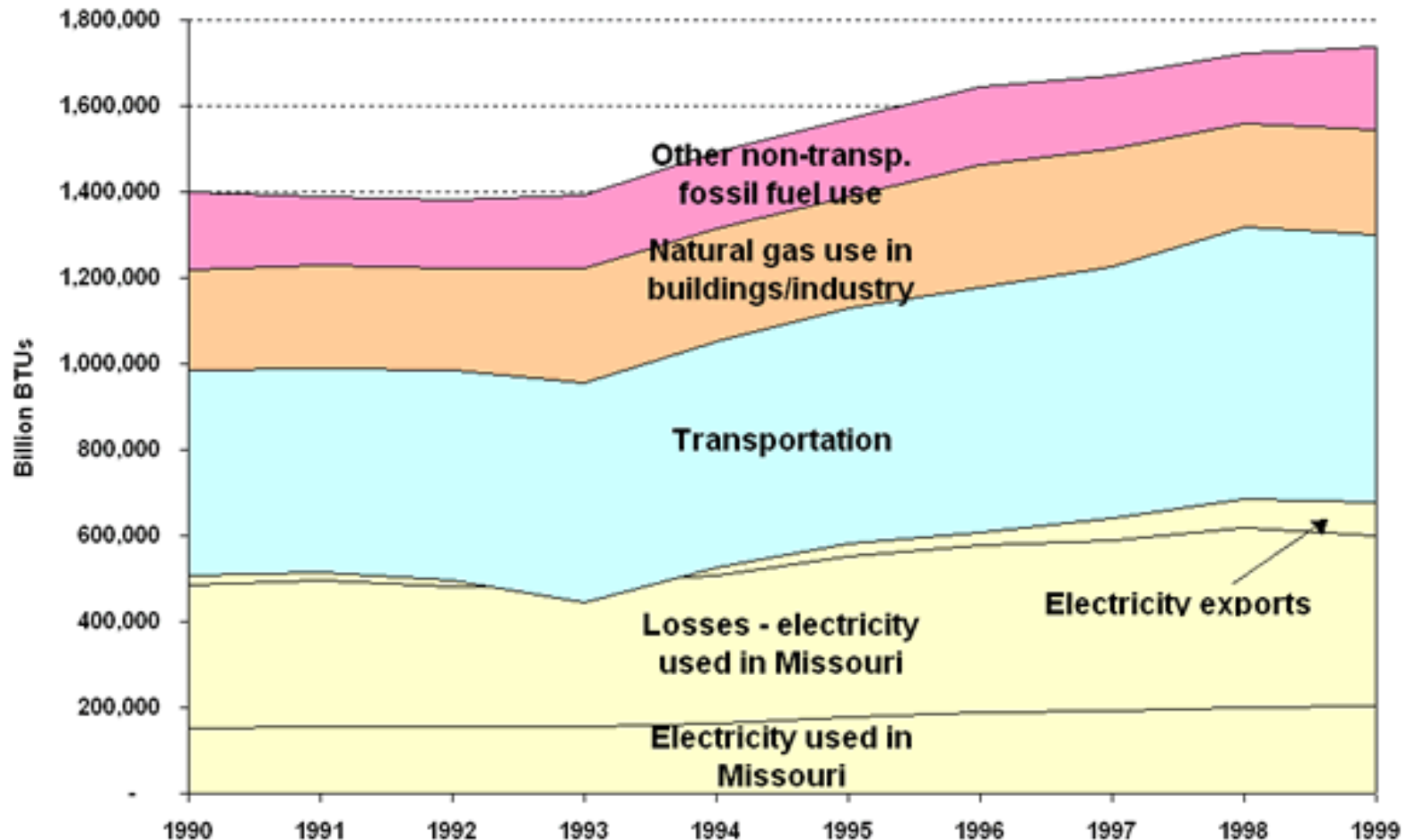
# Issue #3: Missouri's Growing Demand for Energy Resources

- On an aggregate basis, Missouri's electric Investor Owned Utilities (IOUs) have a peak demand annual growth rate of nearly 1.5% . (source: MO PSC Staff Data)
- Consistent with 1.4% population growth rate and per-capita usage data. (source: US Census Bureau)
- In some portions of the state the observed growth rate is higher (Springfield, Branson and south of Kansas City).
- Generally natural gas IOU consumption growth rates have been lower.

# Issue #3: Missouri's Growing Demand for Energy Resources

**Increase in Consumption of Fossil Fuels in Missouri, 1990-1999**

Source: MO DNR EC Data





# Aggregate of the Capacity and Load Forecasts of the Missouri Investor-Owned Electric Utilities (Megawatts - Aug. '06)

	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>
<b>Existing Capacity</b>					
<b>Generation</b>	17,451	17,635	17,644	17,646	18,396
<b>Net Purchases</b>	737	542	521	450	178
<b>Capacity Available</b>	18,188	18,177	18,165	18,096	18,574
<b>Forecasted Peaks with DSM</b>	14,967	15,238	15,504	15,623	15,846
<b>Required Reserves</b>	2,154	2,192	2,229	2,247	2,279
<b>Capacity Required</b>	17,121	17,430	17,733	17,870	18,125
<b>Excess (Shortage) Capacity</b>	<u>1,067</u>	<u>747</u>	<u>432</u>	<u>226</u>	<u>449</u>

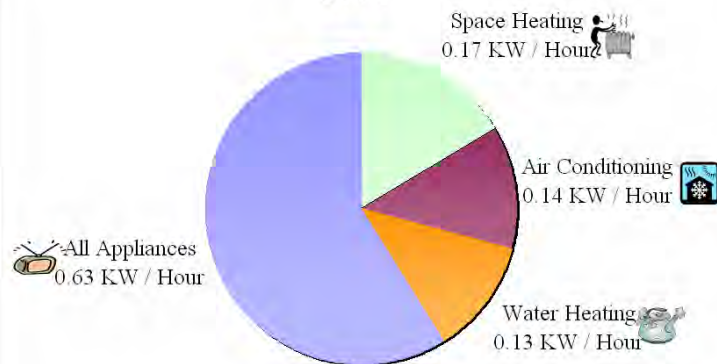


Where is all the electricity going?

# Electricity Use in the Typical U.S. Home

PAST

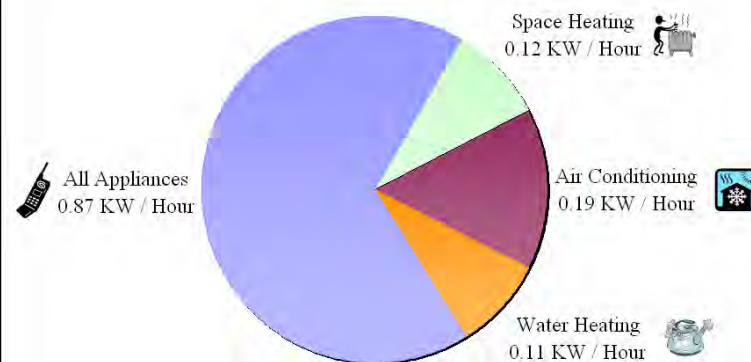
1978



Average Total Use: 1.07 KW / Hour / Household

PRESENT

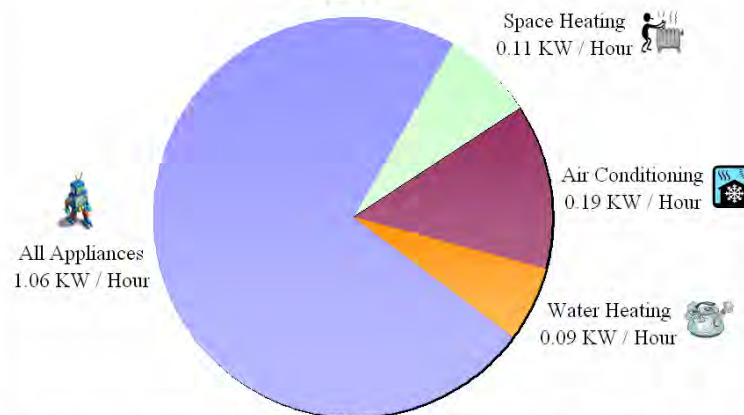
2003



Average Total Use: 1.30 KW / Hour / Household

FUTURE

2030



Average Total Use: 1.45 KW / Hour / Household

# What does all this mean?

- While we have additional capacity, most of the recent capacity additions are peaking units fueled by natural gas.
- Wind power is intermittent capacity.
- Estimates of excess capacity in the short term should not be construed to mean that additional baseload generation is not required.



# What does all this mean?

- Conservatively, we can assume Missouri's demand (IOUs, Municipals, Cooperatives) for generation capacity is growing about 200 MW per year.
- If this trend continues, the state will need to add a new mix of power plants every few years.
- A new 800 MW baseload coal plant can cost more than \$1 billion and take 5 to 8 years to construct.

# Expenses Associated With Renovating and Building Electric Generation



# New Federal Emissions Standards:

- Clean Air Interstate Rule (CAIR) issued by EPA on March 10, 2005
- Will require reduced SO<sub>2</sub> and NO<sub>x</sub> emissions across 28 states and the District of Columbia
- Clean Air Mercury Rule (CAMR) will require reduced Mercury emissions across the same regions
- Programs implement a cap-and-trade system

# New Emission Standards - Impacts

- These emission standards will result in significant reductions in emissions of SO<sub>2</sub>, NO<sub>x</sub> and Mercury.
- In Missouri, the cost of emissions equipment to comply with CAIR/CAMR is estimated to exceed \$2 Billion.
- This estimate does not include any costs associated with choices to retire older units rather than upgrading them.
- Federal legislation on carbon could double this cost estimate.

# Facts about Missouri Coal Plants:

- There are 23 coal plant sites in Missouri.  
(Some sites have more than one plant)
- The average age for an investor-owned coal plant in Missouri is 36.5 years old.  
(Source: Testimony of Chuck Caisley, MEDA, on August 30, 2006)
- Assuming upgrades, the average life of a coal plant is 40 – 60 years.



## Building New Power Plants: The Options are Limited

- There are very limited additional hydroelectric power sites available and permitting would be nearly impossible.
- Wind power can be fairly cheap once the upfront costs are depreciated out and tax credits (if any) are considered; however, energy capacity from these sources is not always reliable and transmission from good wind sites can be a problem.

# Building New Power Plants: The Options are Limited

- Natural gas fired plants are relatively cheap to build and have fewer environmental problems, but a volatile fuel market makes them expensive to operate:
  - Construction costs average less than \$450/kW.
  - Expect natural gas to stay in the \$6 - \$10 per MMBtu range, but several uncertainties could significantly alter this estimate.
  - Almost all of the generation built in the U.S. for the last 10 years uses natural gas for fuel.



# Building New Power Plants: The Options are Limited

- If you're going to operate a power plant more than 1,000 hours per year and depreciate construction costs over 30 years, coal-fired electricity may be cheaper than gas-fired electricity or purchased electricity.
  - Construction costs estimated to be \$1,300 to \$1,800/kW (depending on size of unit and assuming few problems with site or permits).
  - Coal costs increasing to ~ \$20/ton delivered (PRB), over \$1/MMBtu.

# Building New Power Plants: The Options are Limited

- Nuclear power: There are many challenges
  - Large upfront construction cost is estimated at \$1,500-\$3,000/kW (including a number of uncertainties and assuming few problems with site location or environmental permits).
  - A 1,200 MW plant would cost billions.
  - Enormous liabilities associated with nuclear power and unresolved waste disposal issues.
  - Changing government safety standards may make compliance difficult.
  - Can take 10 years to construct.

# Where Do We Go From Here?

- Most utilities are considering additional generation/transmission as well as developing a more diversified generation portfolio that is not so heavily dependent on fossil fuels.
- Renewable generation may be more expensive, less reliable or both.

# Recent & Proposed Generation Additions



## Utility scale wind plants by utility

2001 Aquila, Gray County KS, 112 MW

2004 Columbia MO, citizen referendum, 15%  
from renewable energy by 2022.

2005 Empire E.D., Elk River KS, 150 MW

2006 AECl, Bluegrass Ridge MO 50 MW

2006 AECl, Cow Branch MO 50 MW

2006 KCPL, Spearville KS 100 MW

Photo: Gray County Wind Farm, Montezuma KS





# Increasing Supply to Meet Demand:

We recently approved KCP&L's non-unanimous stipulation and agreement seeking to build an 850 MW coal-fired power plant in Platte County & 100 MW of wind generation.



Iatan Power Plant

# Increasing Supply to Meet Demand:

AECI has announced plans to build a 600+ MW coal plant in Carroll County.

New Plant Similar  
to Thomas Hill Plant



# Increasing Supply to Meet Demand:

Voters in Springfield, Missouri, recently approved a ballot initiative to build a new coal plant.



# New Generation:

## A Key Issue Facing Missouri

- Missouri has not added any new baseload generation in more than twenty years.
- Optimal resource additions in the next 5 to 10 years will include baseload generation.
  - Upgrading existing facilities to comply with new environmental mandates and cost of compliance will put pressure on utilities and ratepayers.
  - New plants are very expensive.
- Natural gas, used by many of the smaller “peaking” generation plants, will likely continue to be relatively expensive and subject to highly volatile market swings.

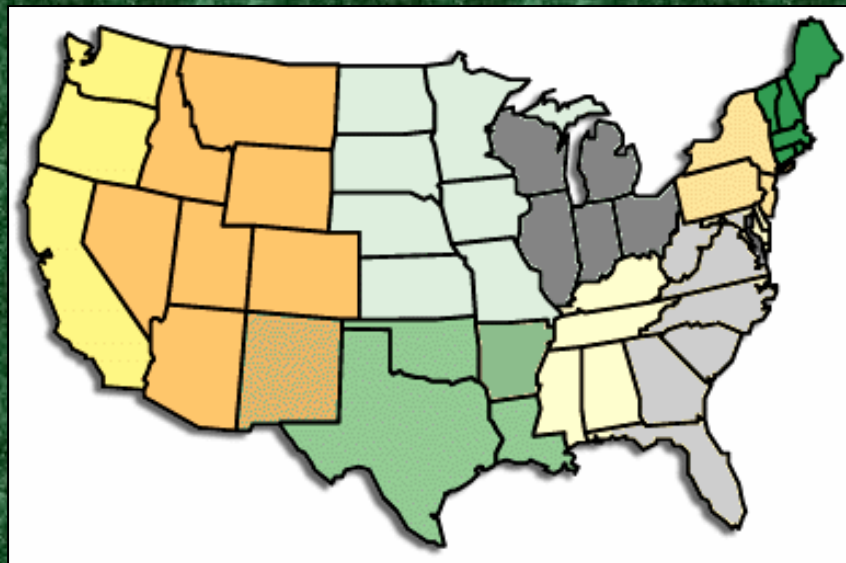


## Missouri's Action Plan: A Few Fundamental Assumptions

- Good News! Missouri has some of the lowest electric rates in the country and a solid foundation for growth.
- There are no quick, easy or magic solutions.
- This is a marathon. We need to use common sense and think long-term.

# High, Low and Average Residential Electric Revenue Per kWh U.S. Census Regions May 2006

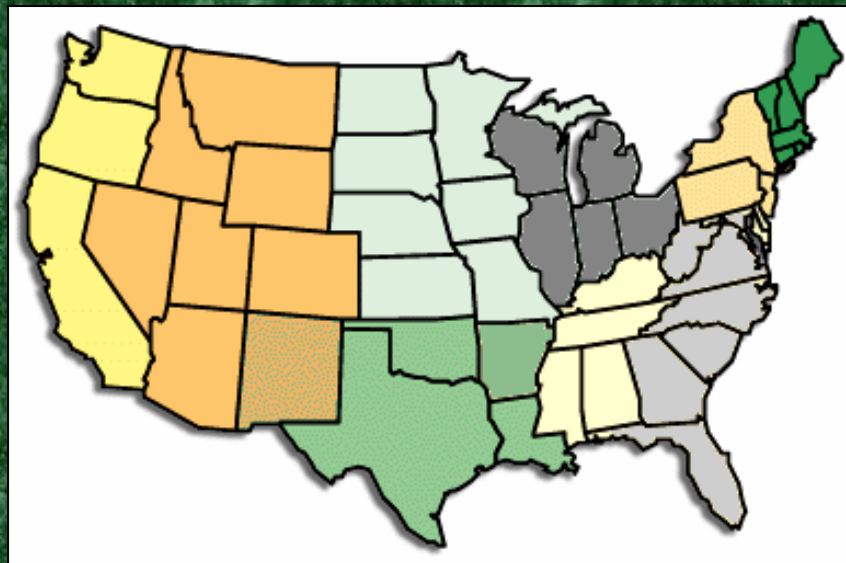
Census Region	Low	High	Avg.
Pacific Contiguous	6.69¢	14.15¢	11.44¢
Mountain	6.47¢	11.29¢	9.44¢
West South Central	8.17¢	12.66¢	11.30¢
West North Central	7.55¢	9.84¢	8.49¢
East North Central	9.01¢	10.77¢	9.72¢
East South Central	7.39¢	9.77¢	8.49¢
South Atlantic	6.76¢	11.79¢	9.96¢
Middle Atlantic	10.88¢	16.22¢	13.07¢
New England	13.85¢	17.07¢	16.59¢



Missouri Residential Rate	8.24¢
U.S. Average Residential Rate	10.60¢
# of states with lower Residential rate	11
# of states with higher Residential rate	38

# High, Low and Average Commercial Electric Revenue Per kWh U.S. Census Regions May 2006

Census Region	Low	High	Avg.
Pacific Contiguous	6.29¢	12.99¢	11.23¢
Mountain	5.51¢	10.07¢	7.61¢
West South Central	6.49¢	9.47¢	8.81¢
West North Central	6.10¢	7.12¢	6.75¢
East North Central	7.56¢	8.91¢	8.30¢
East South Central	6.36¢	9.58¢	7.95¢
South Atlantic	5.62¢	11.82¢	8.41¢
Middle Atlantic	8.99¢	12.83¢	11.22¢
New England	11.99¢	14.96¢	14.13¢

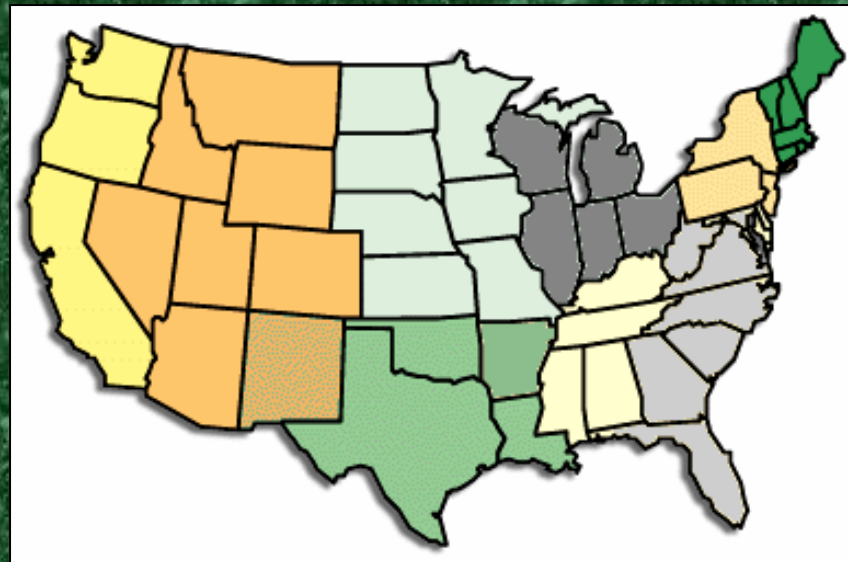


Missouri Commercial Rate 6.61¢  
 U.S. Average Commercial Rate 9.20¢  
 # of states with lower Commercial rate 10  
 # of states with higher Commercial rate 39



# High, Low and Average Industrial Electric Revenue Per kWh U.S. Census Regions May 2006

Census Region	Low	High	Avg.
Pacific Contiguous	3.62¢	8.99¢	6.83¢
Mountain	3.71¢	6.98¢	5.38¢
West South Central	4.87¢	7.68¢	6.90¢
West North Central	4.26¢	5.42¢	4.81¢
East North Central	4.36¢	6.73¢	5.35¢
East South Central	3.73¢	5.91¢	4.72¢
South Atlantic	3.65¢	7.66¢	5.15¢
Middle Atlantic	6.35¢	8.70¢	7.22¢
New England	3.12¢	11.19¢	9.30¢



Missouri Industrial Rate	4.77¢
U.S. Average Industrial Rate	5.83¢
# of states with lower Industrial rate	16
# of states with higher Industrial rate	33



# The Missouri Action Plan (MAP): Promoting Energy Independence

- The Missouri Energy Task Force has developed an action plan of more than 50 recommendations to promote Missouri's energy independence.
- Those recommendations are contained in a separate document, the Missouri Action Plan.
- The following pages highlight some of the key recommendations.

# The Missouri Action Plan (MAP): Three Categories of Recommendations

- The Missouri Action Plan (MAP) recommendations focused on the following three principles:
  - (1) Maintain and enhance our existing energy infrastructure.
  - (2) Enact policies to promote Missouri's energy independence:
    - Conservation;
    - Diversification; and
    - Education.
  - (3) Provide additional assistance to those in need.

# Maintaining & Enhancing Our Infrastructure: Fundamental Assumptions

- New emissions standards will result in increased cost for coal-fired power plants.
- At least in the near-term, we will continue to see growing demand for electricity if we do not take steps to reduce demand.
- Significant expenditures will be required to maintain and enhance our transmission and distribution electricity delivery system if we wish to maintain a high level of reliability.



# Maintaining & Enhancing Our Infrastructure: Fundamental Assumptions

- At least in the near-term, fossil fuels, especially coal, will continue to be a primary source of energy in Missouri.
- If significant carbon-tax emission rules, or more stringent NOX, SOX and mercury rules are enacted, Missouri's utilities may find that nuclear energy is their next best source of baseload electric energy.
- All of these options are growing more expensive.



# Maintaining & Enhancing Our Infrastructure: Overview of Key Recommendations

- Keep existing plants in service so long as it is cost-effective and environmentally sound.
- Maintain capacity reserve margins.
- Work with stakeholders to develop long-term transmission rights.
- Expand and enhance our transmission network.

# Three Types of Recommendations to Promote Missouri's Energy Independence

- Conservation: Encouraging Conservation & Energy Efficiency;
- Diversification: Promoting renewable energy and the use of diverse fuel sources for new generation;
- Education: Creating public awareness for energy issues, conservation measures and public assistance programs.

# Conservation

- The Energy Task Force Report of the Western Governor's Association states:

“Energy efficiency is our cleanest, cheapest, least risky, and least controversial energy resource.”

- However, conservation alone is not going to reduce energy consumption enough to address all the challenges we face.



# Conservation Recommendations: The State Needs to Lead by Example

- Construct buildings to highly efficient standards (2006 IECC Code, Energy Star or higher)
- Develop minimum efficiency standards for all buildings constructed, renovated or operated with state monies.
- Establish a goal of energy savings 2% energy savings per square foot, per year for 10 years.
- Manage building space to ensure savings are retained within state government.



# Conservation Recommendations: Adoption of a Model Energy Code

- Recommended by 1993 study and at least one previous Energy Task Force.
- It should be voluntary or “opt in” for municipalities and counties.
- Communities should be able to modify the code to meet their standards.
- The Code should only apply to new construction or significant renovations.

# Conservation Recommendations: Equal Treatment in Resource Planning

- The Missouri Public Service Commission should consider revising its Integrated Resource Planning (IRP) Rules for adding, retrofitting and retiring electric generation resources.
  - The Commission should consider requiring all cost-effective energy efficiency, verifiable demand response, and conservation programs be integrated into utility resource plans on an equal basis with supply-side resource options.

# Promoting Fuel Diversity & The Rural Economy



# Transportation Fuel Recommendations:

- Require the use of at least 10% Ethanol-blended gasoline in Missouri by 2008. **Accomplished by House Bills 1270 & 1027 (2006 Legislative Session).**
- Statutorily terminate franchise agreements that prohibit or discriminate against the sale of renewable transportation fuels by a franchisee.
- Consider lowering taxes on alternative fuels with lower BTU output than gasoline to achieve tax parity for fuels like E-85.
- Ensure tax credits and other state assistance to finance the development of alternative fuel projects will not be withheld or diverted.
- Work with Missouri auto makers, other states, groups and the federal government to increase the Corporate Average Fuel Economy (CAFE) standards.



# Transportation Fuel Recommendations:

- Revise the Missouri Ethanol & Other Renewable Fuel Sources Commission (Section 414.240 RSMo 2000) to include new members and perform the following duties:
  - make recommendations to the Governor and the General Assembly on changes to state law that will facilitate the sale and distribution of alternative fuels and alternative fuel vehicles;
  - promote the development, sale, and distribution of alternative fuels and alternative fuel vehicles;
  - educate consumers about alternative fuels;
  - craft a long-term plan to reduce the state's consumption of petroleum fuels using a broad range of approaches, including, but not limited to a higher percentage of vehicles on the road using hybrid and plug-in hybrid technology;
  - submit an annual report to the Governor

# Diversifying our Fuel Portfolio: Finding Alternative Fuels for Electricity

- Adopt a 10% Renewable Portfolio Standard (RPS) goal by 2020:
  - Currently, slightly more than 2% of the state's energy comes from renewable sources (hydroelectric and wind)
  - 10% of the state's capacity and/or energy needs for 2020 should come from renewable energy technologies *and verifiable conservation efforts*.
  - The task force recommends a goal and not a mandate to ensure new generation additions are economical.

# Consumer Education Efforts: Essential to Meeting Future Needs



# Consumer Education Recommendations:

- Regular public service announcements (PSAs) to advise the public on energy issues, focusing on conservation, where customers can go for assistance and how customers wishing to make contributions for assistance may do so.
- One easy-to-use toll-free number and web portal where customers can go for utility assistance.
- Customized educational programs developed for different types of housing and different types of customers (senior citizens, ethnic communities, small businesses, etc.) and other hard-to-reach communities.
- A conservation plan that, if properly executed, will enable average residential customers to save at least 10% on their monthly utility bills.
- Regular distribution of energy saving strategies through utility bills.



# Improving Public Assistance: Protecting the Most Vulnerable

# LIHEAP/Utilicare Recommendations:

- Work with Missouri's Congressional delegation to obtain at least \$3.16 billion, and preferably \$3.6 billion, in annual funding for the Low Income Home Energy Assistance Program (LIHEAP).
- Fully fund Missouri's Utilicare Stabilization Fund (approximately \$7.2 million was appropriated in January 2006) to provide additional assistance to Missourians at or below 125% of the federal poverty level and devote at least \$3.6 million of that amount to weatherization.
- Ensure stable funding for both of these programs so that Community Action Agencies know how much money they have to assist low-income families throughout the winter.
- In the event that the state is unable to provide funds, find a permanent funding source for the Utilicare program.

# Weatherization:

- Encourage DFS to appropriate more LIHEAP money for weatherization over a 3-year period and allow Community Action Agencies to have some discretionary authority to spend a percentage of their annual LIHEAP/Utilicare allotment to weatherize their least energy efficient low-income housing.
- The DNR Energy Center shall study the effects of the weatherization efforts and publish a report, which shall include measuring the utility bills for the property before and after the property is weatherized, the amount of financial assistance received by the occupants before and after weatherization, and any other information requested by DNR or the Division of Family Services.



# The PSC Should Consider Innovative Rate Designs

- Consider developing rate programs that allow residential customers to voluntarily lock in a specific rate, those that reward customers with a premium for their conservation efforts and fixed bill programs designed promote conservation and affordability.

NOTE: Hedging does not guarantee customers the lowest price, merely price certainty.



# Other Affordability Recommendations:

- To the extent possible, all utilities should be encouraged to work together to standardize low-income customer assistance programs, which will make mass education efforts easier.
- Lower the percentage of money required for a customer to reconnect their utility services in winter months.

**Accomplished by MO PSC adopting amendments to 4 CSR 240-13.055.**

# Other Affordability Recommendations:

- The PSC should investigate the cost-feasibility and the uses of advanced metering to allow customers to monitor their usage and consumption patterns.
- Monitor the electric and gas wholesale markets for price manipulation, work with the Antitrust Division of the Missouri Attorney General's Office to strengthen Missouri consumer protection laws, and aggressively pursue utilities who violate the law in proceedings in Missouri, at the Federal Energy Regulatory Commission and with the Commodities Futures Trading Commission.

# Conclusions:

- Educate consumers.
- Diversify fuel sources.
- Develop energy efficiency/conservation programs.
- Increase assistance for those in need.